

IV. ENVIRONMENTAL CONSEQUENCES AND MITIGATION

A. INTRODUCTION

The environmental consequences and potential mitigation measures associated with construction of the proposed project were identified through studies of the social and natural environment.

B. PHYSICAL AND BIOLOGICAL ENVIRONMENT

1. Soils and Geology

The No-build and Preferred Alternatives would not impact significant geological resources or soils which will require extraordinary engineering solutions.

2. Water Resources

a. Groundwater

The No-build and Preferred Alternatives would not impact groundwater.

b. Surface Waters

The No-build and Preferred Alternatives would not impact surface waters.

3. Vegetation

The No-build Alternative would not impact vegetation.

The Preferred Alternative would require the conversion of 1.7 ha (4.2 ac.) of vegetation to transportation use (construction of the roadway and designation of a reserved right-of-way).

4. Wildlife

The No-build Alternative would not impact wildlife habitat.

The Preferred Alternative would impact approximately 1.7 ha (4.2 ac.) of wildlife habitat. This impact consists of 1.1 ha (2.6 ac.) of forested area within and to the immediate north and south of the I-95 right-of-way, and 0.6 ha (1.6 ac.) of grassland and scrub-shrub areas to the north of I-95 in the area previously occupied by the Queen City mobile home park. The proposed interchange is not a new facility but the expansion of the existing interstate facility within a predominately urban area; consequently, it is anticipated that the proposed project would not impact wildlife.

A depredation permit from the MDIFW for the removal of rock dove or pigeon (*Columba livia*) nests that may be occupying the I-95 bridge over Stillwater Avenue may be required for construction. If required, MDOT would obtain and comply with the conditions of this permit during the project's construction phase.

5. Aquatic Habitat and Wetlands

The No-build Alternative would not impact wetlands.

The Preferred Alternative would impact approximately 0.2 ha (0.5 ac.) of wetland number 4 shown on Figure III-1. Wetland impacts would be necessary if the project purpose and needs are to be satisfied. The Preferred Alternative was designed to avoid and minimize wetland impacts to the extent possible.

6. Floodplains

The No-build and Preferred Alternatives would not impact floodplains.

7. Threatened and Endangered Species

The No-build and Preferred Alternatives would not impact threatened or endangered species.

C. ATMOSPHERIC ENVIRONMENT

1. Air

The one hour and eight hour CO concentrations at sites for both build and no-build conditions were predicted (Tables IV-1 and IV-2). The maximum future one hour CO concentration of 13.6 ppm was predicted at the northeast corner of Hogan Road and Springer Drive/Bangor Mall Road intersection. Future one hour concentrations at this site and other sites analyzed indicate no violation of the one hour NAAQS for CO.

Table IV-1, Summary of 1 Hour Worst-Case CO Concentrations

Receptor	Land Use	Location	Year of Completion		Design Year	
			No-Build	Build	No-Build	Build
R1	Commercial	SE Corner of Hogan and I-95 NB Off-Ramp	7.9	6.0	8.0	7.1
R2	Commercial	NW Quadrant of Hogan/I-95 Interchange	6.6	5.9	6.2	6.1
R3	Commercial	N of Hogan/I-95 Interchange SB Off-Ramp	9.0	7.1	9.7	8.1
R4	Commercial	W of Hogan/I-95 Interchange NB On-Ramp	7.7	6.2	8.3	7.4
R5	Commercial	NW Corner of Hogan/Mall Intersection	10.7	7.7	10.9	9.9
R6	Commercial	NE Corner of Hogan/Springer Intersection	13.3	9.3	13.6	12.1
R7	Residence	W Side of Stillwater, N of I-95	5.2	5.1	5.3	5.8
R8	Residence	W Side of Stillwater, SW of Proposed Ramp	5.1	5.7	5.1	6.2
R9	Healthcare	E Side of Stillwater, S of I-95	4.8	5.4	4.8	4.7
R10	Residence	E Side of Stillwater, S of Proposed NB Off-Ramp	5.1	5.0	5.1	5.1
R11	EMTC	E of Proposed I-95 NB Off-Ramp	5.4	5.2	5.5	5.3

NAAQS for Carbon Monoxide = 35 ppm (1 hour).

All values include background concentration of 4 ppm.

All 1 hour values assume Stability Class F conditions; 2.5 mps wind speed; worst case wind angle.

Note: No major increase in traffic volumes is projected for the five-year period between the 2020 D.Y. used in this analysis and the final traffic D.Y. Any increase in traffic will be offset by reduced future emission factors. All projections will provide an improvement over projected future no-build conditions.

Table IV-2 summarizes the calculated 8 hour worst case CO concentrations within the study area. Assumptions used in the calculation reflect fluctuation of traffic volumes, stability class, and vehicle composition during a typical worst case eight hour period. All values assume a background eight hour concentration of 2 ppm. The highest predicted eight hour CO concentration was 6.6 ppm, indicating no violation of the eight hour NAAQS for CO.

Table IV-2, Summary of 8 Hour Worst-Case CO Concentrations

Receptor	Land Use	Location	Year of Completion		Design Year	
			No-Build	Build	No-Build	Build
R1	Commercial	SE Corner of Hogan and I-95 NB Off-Ramp	3.9	3.0	3.9	3.5
R2	Commercial	NW Quadrant of Hogan/I-95 Interchange	3.2	2.9	3.1	3.0
R3	Commercial	N of Hogan/I-95 Interchange SB Off-Ramp	4.4	3.5	4.7	4.0
R4	Commercial	W of Hogan/I-95 Interchange NB On-Ramp	3.8	3.1	4.1	3.6
R5	Commercial	NW Corner of Hogan/Mall Intersection	5.2	3.8	5.3	4.8
R6	Commercial	NE Corner of Hogan/Springer Intersection	6.5	4.5	6.6	5.9
R7	Residence	W Side of Stillwater, N of I-95	2.6	2.5	2.6	2.9
R8	Residence	W Side of Stillwater, SW of Proposed Ramp	2.5	2.8	2.5	3.1
R9	Healthcare	E Side of Stillwater, S of I-95	2.4	2.7	2.4	2.3
R10	Residence	E Side of Stillwater, S of Proposed NB Off-Ramp	2.5	2.5	2.5	2.5
R11	EMTC	E of Proposed I-95 NB Off-Ramp	2.7	2.6	2.7	2.6

NAAQS for Carbon Monoxide = 9 ppm (8 hour).

All values include background concentration of 2 ppm.

All 8 hour values assume an 8 hour conversion factor of 0.48 (0.48 times 1-hour concentration, excluding background) based on the following assumptions:

- Worst case 8 hour period from 3:00pm to 11:00pm.
- 2.5 mps wind speed and worst case wind angle occurring continuously for the entire 8 hour period.
- Stability Class D from 3:00pm to 4:00pm; Stability Class F from 4:00pm to 11:00pm.
- Hourly traffic volumes of from 3 to 10 percent of ADT, with 10 percent in 4-5pm peak hour period and 45 percent of ADT occurring in 8 hour period.
- Typical vehicle composition fluctuation during 8 hour period.

Note: No major increase in traffic volumes is projected for the five-year period between the 2020 D.Y. used in this analysis and the final traffic D.Y. Any increase in traffic will be offset by reduced future emission factors. All projections will provide an improvement over projected future no-build conditions.

Differences in concentrations for the No-build and Preferred Alternatives and the various analysis years reflect the distribution of traffic between these conditions, the traffic growth, and the reduction with time of vehicle emissions. While slight increases in concentrations are indicated with the Preferred Alternative in the vicinity of the interchange (Sites R7, R8, and R9), more substantial decreases in concentrations are predicted at sites along Hogan Road due to the reduction of traffic on certain roadway sections.

None of the receptor sites analyzed are predicted to experience violations of either the one hour or eight hour NAAQS for CO.

2. Noise

The computer model used to predict future noise levels was the FHWA Traffic Noise Model (TNM). The TNM uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (horizontal and vertical alignment, grades, cut or fill sections, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation.

Noise predictions were based on traffic data (including design hour volumes and truck percentages) for the years 1998 and 2020. The posted speed of 55 mph (89 km/hr) was used for I-95 traffic; Stillwater Avenue traffic and on- and off-ramp speeds ranged from 35 to 45 mph (56 to 72 km/hr) depending on roadway geometry.

The FHWA regulations indicate traffic noise impacts occur when the predicted traffic noise levels either: [a] approach or exceed the FHWA noise abatement criteria (with "approach" meaning within 1 dBA of the NAC value), or [b] substantially

exceed the existing noise levels. The MDOT Highway Traffic Noise Policy defines an impacted receiver as "Any receiver which approaches (within 1 dBA) or exceeds the NAC for the corresponding land use category, or any receiver that exceeds existing noise levels by 15 dBA." MDOT's policy is consistent with FHWA policy and infers substantial impact to be an increase of over 15 dBA. Consideration for noise abatement measures must be given to receptors which fall into either category.

Modeling was conducted at 35 separate receptor sites in project area (Table IV-3). For each receptor site, information is presented which identifies the predicted existing noise levels, predicted future (2020) No-build noise levels, unabated 2020 build noise levels with the proposed interchange configuration, and 2020 build increases (or decreases) in noise levels over 1998 levels and future no-build levels. No sites are predicted to have substantial increases (greater than 15 dBA) over existing levels with either the No-build or Preferred Alternative.

Table IV-3, Noise Level Summary

Receiver	Dwelling Units	Leq Noise Levels in dBA					
		Existing 1998	No-Build 2020	Build 2020	No-Build I.O.E.	Build I.O.E.	Build Increase Over No-Build
SER2	6	68.6	69.8	69.6	1.2	1.0	-0.2
SER3	3	67.0	68.2	67.8	1.2	0.8	-0.4
SER4	3	66.2	67.4	66.3	1.2	0.1	-1.1
SER5	4	67.0	68.2	68.1	1.2	1.1	-0.1
SER7	4	64.8	66.0	66.2	1.2	1.4	0.2
SER11	4	66.0	67.2	67.1	1.2	1.1	-0.1
NW4	1	69.4	70.6	70.4	1.2	1.0	-0.2
NW5	1	70.1	71.3	70.4	1.2	0.3	-0.9
NW6	3	65.6	66.7	65.2	1.1	-0.4	-1.5

I.O.E. = Increase over existing.

Note: All receptors are residential units. SER receivers are in the southeast quadrant of the Stillwater Avenue/I-95 intersection. NW receivers are located in the northwest quadrant of the Stillwater Avenue/I-95 intersection near the connection of the proposed ramp on Stillwater Avenue.

A doubling of traffic volume would be required over the five-year period between the 2020 D.Y. used in this analysis and the final traffic D.Y. to generate a perceptible change of 3dBA or greater. Increases in traffic over this five-year period are not projected to be substantial, therefore no significant effects are anticipated. Predicted build noise levels will be an improvement over predicted no-build conditions.

While no significant increases in noise are predicted due to the proposed interchange, existing and future noise levels at certain receptors are sufficient to warrant consideration of noise abatement. When such warrants exist, examination and evaluation of alternative noise abatement measures for reducing or eliminating noise impacts must be considered. Traffic control methods (such as speed limit reductions) have insignificant effects on noise levels and are difficult to consistently enforce. Geometric modifications can have an impact on noise levels. Substantially moving the alignment of I-95 is not feasible and would only redistribute noise within the study area. Noise barriers reduce noise levels by blocking the sound path between a roadway and noise sensitive areas. The construction of the proposed northbound off-ramp will result in the ramp acting as a noise barrier, providing abatement of mainline I-95 noise at several receptors.

For a noise barrier to be considered feasible by MDOT it must provide a minimum insertion loss of 5 dBA (preferably 10 dBA) for first row benefited receptors, be consistent with safety and operational factors, and be feasible to construct. Pedestrian and motorist safety adjacent to noise barriers and at noise barrier access openings (driveways, crossing streets, etc.) is of primary concern due to the restricted sight distance from the observer to oncoming traffic. Barriers along free access roadways such as Stillwater Avenue are not feasible. Maintenance requirements and structural implications are other factors requiring careful consideration during the noise barrier evaluation process.

While a noise barrier may be feasible, it must also be determined to be reasonable. A primary factor in MDOT's consideration of the reasonableness of noise barrier installation is that the barrier costs no more than \$20,000 per residence benefiting (those residences receiving 5 dBA or more reduction). In addition, the overall noise abatement benefits of the barrier must outweigh the overall adverse social, economic, and environmental effects and the costs of the abatement measures. Reasonableness will be based on these considerations and other factors which include the number of units protected, cost effectiveness, land use, future noise levels, and the residents' desires. Noise barriers will not be built if most affected residents do not want them.

The receivers in Table IV-3 indicate sites and conditions where consideration of noise abatement is required. Sites NW4, NW5, and NW6 (along Stillwater Avenue) have future noise level predictions similar to existing conditions, with Stillwater Avenue traffic being the predominant noise source. The Preferred Alternative will result in slightly lower levels than the No-build Alternative for these sites. Abatement of noise at these sites is not feasible due to access requirements and the resultant barrier gap effects discussed above.

While an effective noise barrier could be constructed along I-95 northbound, it would have to extend across the existing Stillwater Avenue bridge and beyond the project limits (to the south). Construction of a barrier would require reconstruction of the Stillwater Avenue bridge and widening of the I-95 northbound roadway to the south to provide adequate shoulder area for sight distance, safety, and snow storage. Even if the modifications were found to be feasible, their costs would likely exceed the \$20,000 cost per residence criteria. No barrier within the study area was found to be feasible and reasonable. Since future noise levels at these sites will be less with the new interchange as compared to the No-build Alternative (due to the barrier effect of the northbound off-ramp) and given the feasibility and reasonableness considerations, noise barriers are not recommended.

General construction noise impacts, such as temporary speech interference for those individuals living or working near the project, can be expected. Construction noise impacts may be particularly noticeable during paving operations, earth moving, and grading operations. Overall, construction noise impacts are expected to be minimal, since the construction noise is relatively short in duration and is generally restricted to daytime hours.

D. LAND USE, HISTORIC AND SOCIOECONOMIC ENVIRONMENT

1. Land Use

The No-build Alternative would not directly impact land use. Indirectly, the No-build Alternative would affect land use by potentially limiting additional commercial development in the mall area. Further development in the area may be denied local and state approval due to traffic concerns. This alternative is not consistent with city land use plans as expressed in the 1990 comprehensive plan.

The Preferred Alternative would result in the conversion of approximately 2.0 ha (5.0 ac) of vegetated and vacant land to transportation use. This conversion is compatible with the Bangor Comprehensive Plan.

2. Prime and Unique Farmland

The No-build Alternative would not impact farmlands.

The Preferred Alternative would impact 1.6 ha (4.2 ac) of soils originally mapped as prime farmland soils. No active farmland in the study area would be impacted.

3. Community Facilities and Services

The No-build Alternative would not impact community facilities or services. Continued traffic congestion in the study area could cause emergency service delays.

The Preferred Alternative would improve accessibility and response times to vehicle accidents on I-95 in the vicinity of Stillwater Avenue. By reducing congestion along Hogan Road, the Preferred Alternative may reduce emergency service response times during peak traffic periods compared to response times with the No-build Alternative.

A sidewalk would be provided along the eastern side of Stillwater Avenue at the intersection created by the interchange ramps with Stillwater Avenue. A pedestrian and bicyclist refuge island would be provided between the interchange off-ramps and the I-95 southbound ramp. The intersection of the interchange ramps and Stillwater Avenue would be controlled by traffic signals.

4. Neighborhood and Community Cohesion

The No-build and Preferred Alternatives would not result in substantial changes to community characteristics. The area appears demographically stable, with few forces to alter demographic characteristics, such as the availability of large tracts of developable residential land. Population change will have only minor impacts because the area contains only a small share of housing and is planned for further commercial/service development.

The No-build and Preferred Alternatives would not result in the displacement of residences or businesses.

5. Environmental Justice

The No-build and Preferred Alternatives would not result in discriminatory or disproportionate consequences or impacts for minority or low-income populations.

6. Business Activity Levels

The No-build Alternative would not directly impact business activity in the area. The No-build Alternative would indirectly impact business activity in the area by not improving traffic congestion in the mall area and threatening the approval of future development permits.

The Preferred Alternative would not directly impact business activity in the area. Indirectly, the Preferred Alternative may facilitate the continued development of the Bangor Mall area (IV-E, Secondary and Cumulative Impacts).

7. Employment

The No-build Alternative would not directly impact employment in the study area. The No-build Alternative would indirectly impact employment in the area by not improving traffic congestion in the mall area and threatening the approval of future development permits.

The Preferred Alternative would not directly impact employment in the area. Indirectly, the Preferred Alternative may facilitate the continued development of the Bangor Mall area (IV-E, Secondary and Cumulative Impacts).

8. Traffic

The No-build Alternative would not immediately impact traffic in the study area. Over time, the traffic volumes on Stillwater Avenue would gradually increase in response to growth and development in the area (Figure III-4).

The Preferred Alternative would result in additional traffic on Stillwater Avenue (Figure IV-1). To the north of the intersection created by the interchange ramps with Stillwater Avenue, the traffic on Stillwater Avenue would increase by approximately 1107 vehicles in the northbound direction and 722 vehicles in the southbound direction, during the design hour, for the year 2005. To the south of the intersection created by the interchange ramps with Stillwater Avenue, the traffic on Stillwater Avenue would increase by approximately 169 vehicles in the northbound direction with no change in the southbound direction, during the design hour, for the year 2005.

For the year 2025, the traffic on Stillwater Avenue would increase by approximately 1616 vehicles in the northbound direction and 945 vehicles in the southbound direction, during the design hour, to the north of the intersection created by the interchange ramps with Stillwater Avenue. The traffic on Stillwater Avenue would increase by approximately 276 vehicles in the northbound direction with no change in the southbound direction, during the design hour, to the south of the intersection created by the interchange ramps with Stillwater Avenue.

The intersection created by the interchange ramps with Stillwater Avenue would be controlled by traffic signals. Turning lanes from Stillwater Avenue to the I-95 southbound on-ramp would be provided. Left turns onto Stillwater Avenue from the I-95 northbound and southbound off-ramps would be prohibited.

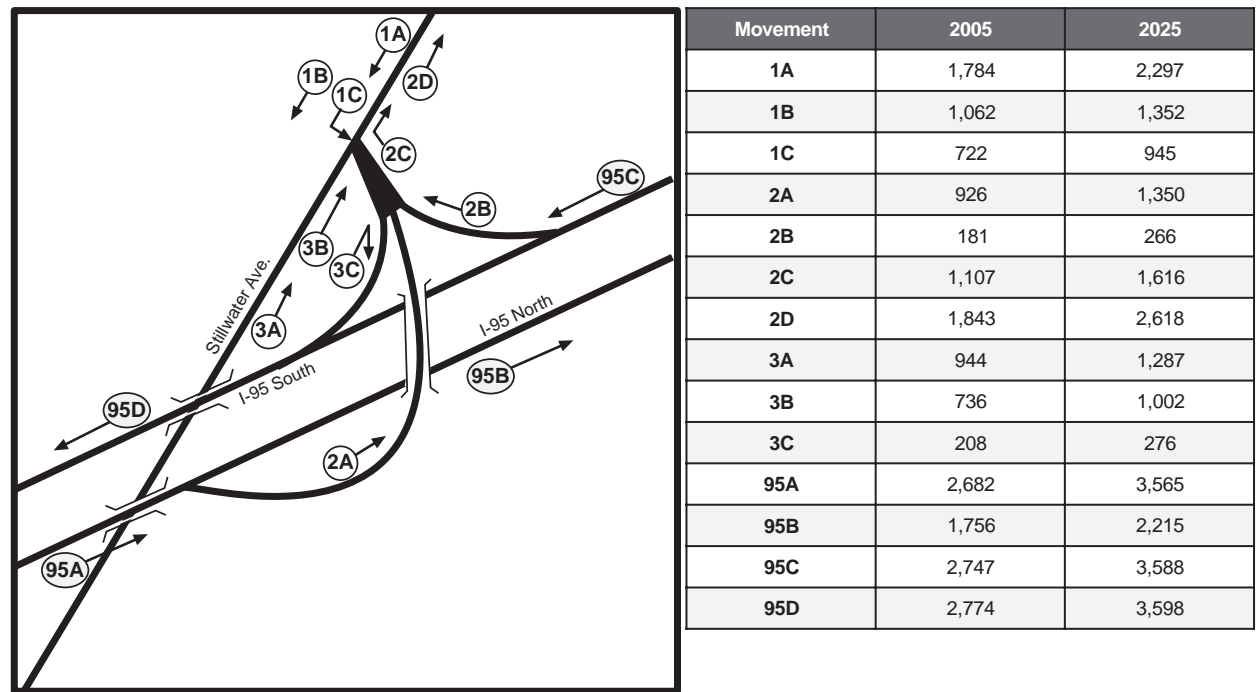


Figure IV-1, Design hour traffic volumes with the Preferred Alternative

E. SECONDARY AND CUMULATIVE IMPACTS

1. Secondary Impacts

Select properties expected to experience secondary impacts in the form of conversion to commercial uses are generally adjacent to existing commercial areas. Areas of potential secondary impacts from the proposed project were identified as parcels or portions of parcels exhibiting the following characteristics:

- Currently undeveloped or not highly developed (e.g., single residences).
- Absence of identified natural features that would discourage development.
- Identified in the City's land use concepts map as future commercial land use.
- Proximate to existing Stillwater-Hogan area commercial development (i.e., "leapfrog" type development was ruled out).
- Having access to existing roads.

The Preferred Alternative is projected to contribute indirectly to the conversion of approximately 94.3 ha (233 ac) of land to commercial use and the construction of approximately 195,000 square meters (2.1 million square feet) of commercial

floor space. The project is not projected to attract “additional” growth. The project will only allow current projected development to occur at a normal rate, since the improvements to the traffic constraints will no longer hinder site location permitting.

The secondary environmental effects consist of the potential conversion of the following land uses to urban uses:

Wetlands	12.1 ha (30 ac)
Wooded Areas	2.4 ha (6 ac)
Rangeland	26.3 ha (65 ac)
Pasture	29.9 ha (74 ac)
Grassland	10.5 ha (26 ac)
Developed areas subject to more intense development	12.9 ha (32 ac)

These potential secondary land use changes may have the economic effect of increasing jobs and local income and adding approximately \$2.7 million per year in increased property tax revenues at build out.

Some of the lands projected as likely to be developed contain prime farmland soils and soils of statewide importance. Because agricultural uses in the area are limited and the city has zoned the area for continued commercial development, the secondary impacts of the Preferred Alternative on farmlands are considered minor.

Wetland impacts from other actions in the area would require separate approval.

These secondary impacts are consistent with the City land use plans because the potentially affected properties are within the designated commercial and growth areas in accordance with Bangor’s comprehensive plan update of June 1990.

2. Cumulative Impacts

If constructed, the parallel service road (Section III-E, Secondary and Cumulative Impacts) would further enhance the attractiveness of the properties northwest of Stillwater Avenue for commercial development. The impact of this service road is anticipated to shift the focus of commercial development to the Stillwater Avenue area. The service road would likely only serve to change the focus of commercial growth and not induce additional commercial development. In 1998, this parallel service road was added to the official city street map; no other action on this project has been taken. The cumulative effect of the Preferred Alternative, when added to the Stillwater service road, are not substantially different from the effects without the service road.

The traffic projections prepared by the MDOT indicate the need to widen I-95 through the mall area to three lanes in each direction before the Design Year 2025. Sufficient width exists within the median to widen the road, thereby limiting adverse impacts. The cumulative effect of the Preferred Alternative, when combined with the widening of I-95, are not substantially different from the effects without the widening.

The improvement of the Kittredge Road/Stillwater Avenue intersection (Section III-E) would not result in increasing lands available for development, but may increase the potential for commercial development to occur along Kittredge Road. This project has been designed by the city of Bangor and it is anticipated that it would be constructed in 2000.

F. SUMMARY OF PROJECT COMMITMENTS

The following measure has been developed to mitigate the impacts of the proposed project to features in the study area:

Wetlands — The MDOT would compensate unavoidable impacts by complying with the Clean Water Act Section 404(b)(1) guidelines, the accompanying *Memorandum of Agreement* between the USACOE and the USEPA, the *Highway Methodology* (USACOE — New England Division, November 1993), and Chapter 310 of the Maine Natural Resource Protection Act (NRPA). The level of mitigation proposed in the project permit application would be appropriate and practicable (defined in Section 230.3(q) of the Federal guidelines), as determined by state and federal permitting agencies.

1. Compensation

After wetland impacts have been avoided and minimized to the greatest extent possible, MDOT will compensate any unavoidable impacts by complying with Chapter 310 of the Maine Natural Resource Protection Act (NRPA). As determined on similar MDOT projects in the past, no compensation is expected to be required under the Clean Water Act Section 404(B)(1) guidelines. The level of compensation proposed in the project permit application will be appropriate and practicable as determined by the MDEP. The goal of compensation will be to provide wetland functions that will be affected by project activities at an 8:1 ratio for preservation, including upland areas, for all affected wetlands (Chapter 310 NRPA).

The following protocol has been used to determine appropriate compensatory mitigation:

- 1) Site search area: on and close to the project, expanded as necessary by watershed boundaries until appropriate and practicable site located;
- 2) Preferred site to replace functions “in kind”;

MDOT has coordinated with permitting agencies regarding site evaluation, review and agreement on preferred site through MDOT Interagency Permit Meetings, related correspondence and personal contacts. MDOT provided detailed information on characteristics of 18 potential sites by location, size, ownership, and existing conditions. This information allowed the agencies to determine acceptable compensation site(s). This included additional information, as requested, to clarify proposed compensation.

2. Preferred Site

The Gould Landing site, located in Orono, Maine, has been determined acceptable compensation by the MDEP. This site is approximately 3/4 wetland (palustrine emergent wetland / scrub-shrub) and 1/4 upland. A 1.6 ha (4.0 ac) portion of the site will be offered as compensation on this project, according to the 8:1 ratio for preservation that NRPA requires. The narrative Preliminary Plan will be submitted with the permit application for the project. This plan will include project background, site selection process, existing conditions, objectives, and long term maintenance.

This site was selected after 18 sites were considered by a multi-agency group, including State and Federal representatives. Sites had potential for restoration, creation, enhancement and preservation and all but three were dropped from consideration because they were either not feasible or not available. The final three sites were field reviewed by the multi-agency group and the Gould Landing site became the preferred site (letters from MDEP dated November 1 and November 14, 1996). Functions that will be provided by this site include wildlife habitat, floodflow alteration, groundwater recharge/discharge, and water quality improvement.